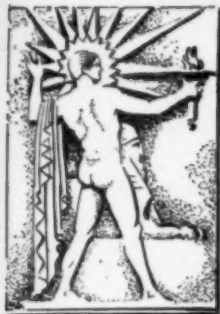


AUG 18 1930



# SCIENCE NEWS-LETTER

*The Weekly Summary of Current Science*

A SCIENCE SERVICE PUBLICATION

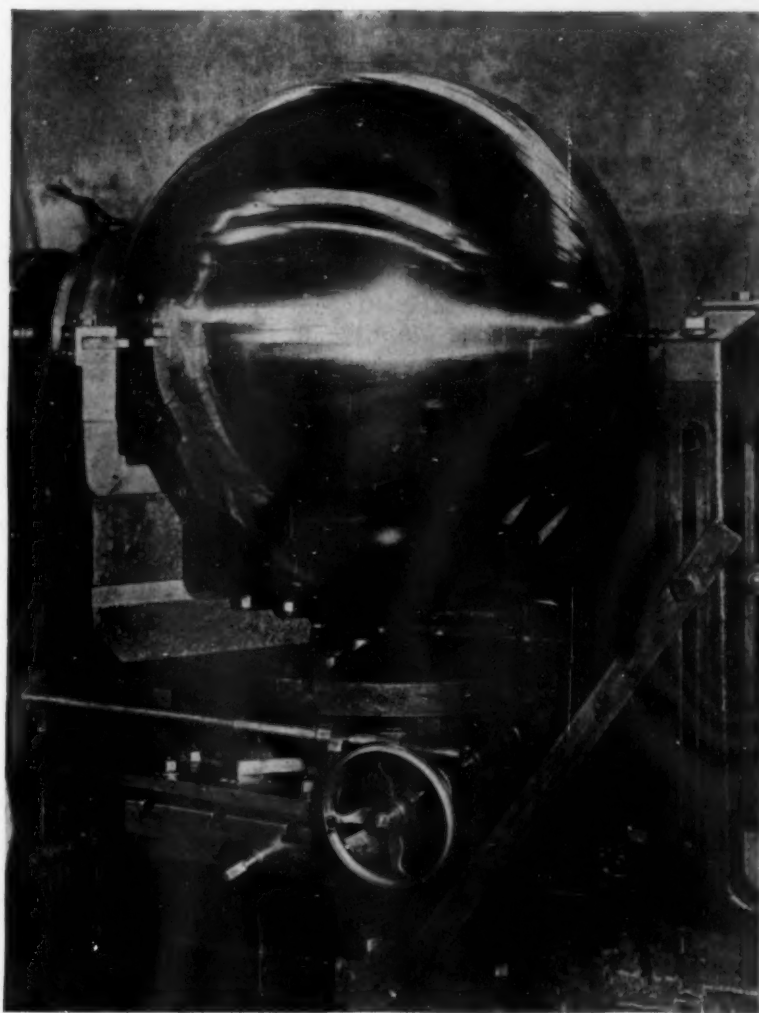


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August 16, 1930



## MEASURES MAN'S LIGHTNING

*Two Million Volts Will Jump From This Spun Sphere*

(See page 110)

Vol. XVIII

No. 488

# Can Scientists Tell Babies Apart?

Physiology

## They Have an Easy Test in the Watkins-Bamberger Suit

ARE heredity experts justified in assuming the role of Solomon in a dispute between parents over the identity of their offspring?

"Sometimes, only," is the answer indicated by the mass of data accumulated by science to date on this question, which has awakened such controversy in the Watkins-Bamberger suit concerning the alleged interchange of babies at the Englewood Hospital in Chicago. In many instances, the experts would be forced to shrug their shoulders without essaying a definite "Yes," or "No," to the pleas of distraught parents.

While complete reports of the findings have not been made public, newspaper accounts seem to indicate that this is a case where the blood group tests to establish parentage could apply. For the parents in question are said to belong to different blood groups and the children, according to the laws of heredity, would be distinguishable by a corresponding difference in type.

Physiologists have established that practically all human beings belong to one of four principal blood groups and that children inherit the characteristics of either one or the other of their parents, if they do not take after both.

Difference in blood group is readily detectable when the blood of two individuals is tested, because of the clumping or "agglutinating" effect that alien blood strains have on each other, whereas blood from different persons of the same group mingles freely.

### Blood Test Used

Thus if a father and mother, both belonging to Group O, were left with the choice of two infants, of Group O and A, respectively, theoretically the Group O baby would be their blood kin, and the A Group child could not be.

Father and Mother Watkins both happen to belong to the O Group, if

published accounts are accurate. But the baby delivered to them by the hospital is of Group A, and not their child by verdict of the blood tests. Mother Bamberger, on the other hand, is said to belong to the AB Group, yet the baby in her arms is an O Group child. All of which sounds like a mixup somewhere.

One caution has been urged on modern Solomons by scientists, however. Very young infants may not have their final blood group fully established. With infants less than a month old, the test should be repeated after several months have elapsed.

If this suggestion is complied with, it will mean that the disputed pair of infants of the Watkins and Bamberger domiciles should undergo a confirming test. Then, if the published accounts of the findings are accurate, the verdict should be reasonably certain.

With all the controversy that is raging around the heads of the Chicago experts, no one would envy them their job. Yet the Watkins-Bamberger case of mixed identities

is a simple one to unravel compared to what might have been. If, for instance, one parent of each family had belonged to the same blood group (say Group A), and both children had by a prank of fate been Group A babies, then all the experts could have done would have been to let the parents fight it out between themselves and the hospital authorities, as they are doing anyway.

### Chances for Success

Some idea of the difficulty facing a modern Solomon may be gleaned from a report of the chances of establishing a child's paternity by blood grouping tests, mathematically computed by Dr. Sanford B. Hooker and Dr. William C. Boyd of the Evans Memorial for Clinical Research and Preventive Medicine of Boston. They estimate that in cases where the paternity of the father alone was brought into question, the probability of establishing non-paternity was one to five for Group O, one to 17 for Group A, one to seven for Group B, and one to two for Group AB. These probabilities are based on the frequency of distribution of the groups among the white population of the United States and upon the laws governing the inheritance of blood groups.

That the Bamberger parents were Jewish and the Watkins parents Gentile might be thought to have simplified the problem facing the experts, but science has been cautious about accepting any rule for determining race, either by blood tests or from peculiar shaping of the head, as infallible. Though extensive studies have shown a tendency among the Jews to fit into a different blood group from the peoples of a western origin, individual exceptions are too numerous to allow application of this test to apply in a case of lost identity. The same criticism applies to finger print tests.

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### The Answer Is In This Issue

What chance have scientists of telling the Watkins-Bamberger babies apart? p. 98—Is it possible that countries will exchange secondary school children to promote international cooperation? p. 99—In what way can aviators lessen the dangers of weather? p. 100—Are other parts of the world wet or dry while the United States parches? p. 102—Can a butterfly wing take a picture of itself in the dark? p. 103—Does your heart beat faster when you think hard? p. 104—How is the world protecting itself from gases of both peace and war? p. 106—What peculiarity of light makes it possible for astronomers to measure the speed of spinning stars? p. 109.



SCIENCE NEWS-LETTER, The Weekly Summary of Current Science. Published by Science Service, Inc., the Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by Watson Davis.

Publication Office, 1918 Harford Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C. Address

all communications to Washington, D. C. Cable address: Scienservice, Washington.

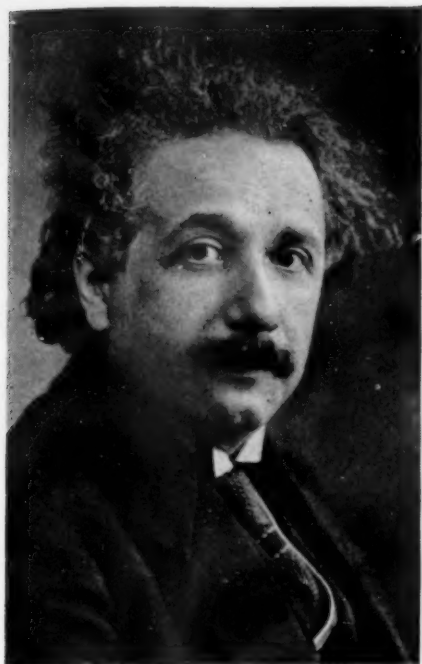
Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. Patent Office.

Subscription rate—\$5.00 a year postpaid. 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science.

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Prof. Albert Einstein, of Germany

A GROUP of intellectual leaders of the world, among them Mme. Marie Curie and Prof. Albert Einstein, have just finished six days consideration of how international cooperation in science, literature and art can best be promoted and stimulated.

As a part of the League of Nations, the International Committee on Intellectual Cooperation is charged with coordinating the intellectual activities of the world. As is the case with many of the technical committees of the League, Americans take active part in the deliberations of this body of distinguished membership. This year Dr. Vernon Kellogg, permanent secretary of the National Research Council and acting director of Science Service, attended the sessions as alternate for Dr. R. A. Millikan, the American physicist.

#### International School Children

The codiscoverer of radium, Mme. Marie Curie, and the founder of the theory of relativity, Prof. Albert Einstein, both took an active part in this year's meetings of the committee. Paul Painlevé, equally well known in French political and scientific circles, former premier of France, joined in the sessions held under the presidency of Prof. Gilbert Murray, Oxford professor of Greek.

Dr. Aikitu Tanakadate, Tokio professor and advocate of the Roman

alphabet for the Japanese language, Prof. Alfredo Rocco, Italian minister of Justice, Mlle. K. Bonnevie, professor of zoology at the University of Oslo, Norway, Sir Frank Heath, British educator and scientist, and Dr. Hugo A. D. Krüss, director of the Prussian National Library, were among the members of the committee in attendance.

One of the interesting projects considered was the possibility of various countries exchanging secondary school children in much the same way that college students, graduates and professors have visited various foreign countries as a part of their education. Use of motion pictures in teaching science, art and literature and the possibility of international exchanges of educational films came before the committee.

#### Data for All

How to make accessible to all research workers the vast accumulations of published data on science that are being provided by the printing presses of all countries is another problem before the intellectual leaders. Whether scientific discoveries and developments should be given protection similar to that afforded inventions by patent laws is another question that received some discussion this year as well as in past annual sessions.

The committee reorganized the International Institute of Intellectual Cooperation at Paris which operates under its direction and appointed an executive committee to promote greater efficiency in the work of intellectual cooperation. The staff of the Paris institute was reduced, a program of concentration was adopted and the resignation of M. Julien Luchaire, director of the institute, was accepted. M. Henri

Bonnet of France, a League of Nations secretariat official, was elected to succeed M. Luchaire.

The offices of the International Institute of Intellectual Cooperation are located in the famous Palais Royal in Paris. Although the institute is international in scope and has a staff of experts from various countries, it receives financial support from the French government. National committees for intellectual cooperation have been organized in various countries, including the United States, and they cooperate and aid the International Committee and the Institute in Paris by formulating national opinions and giving consideration to proposals that are to come before the international body.

*Science News-Letter, August 16, 1930*



Mme. Marie Curie, of France

# Leaders of Thought Plan Cooperation Among Nations

*General Science*



Threatening Peaks Hidden by Clouds From Planes Above

## Keeping up with the Weather — for Aviation

By DR. W. J. HUMPHREYS  
U. S. Weather Bureau

**I**T was only a few years ago when the first bold attempts were made at flying. Bold because no one then knew how to fly; because also the engines were bad and balky; and because the wings and all other parts of the machine were flimsy and wrongly shaped.

And when flights were made they generally were only short hops close to the ground and in the deadest calm. But improvements were rapid.

Today there are engines that will deliver hundreds of horse power for weeks at a time with never a moment's failure, and machines so constructed in every detail as to secure the greatest possible lift and speed with the least hindrance to their movement through the air. There also are many devices at the aviator's disposal to help him on his way, and there are trained pilots, too, some of whom are so skillful that they could fly a barn door with a donkey engine, or mighty near do it.

Every thing that pertains to aviation, with but one exception, has greatly and marvelously improved. Indeed, we can say with assurance that some things have come close to perfection.

We know from theory and from experiment that the drag of a wind on an object is smallest when it is so shaped that the air slips over it without the formation of eddies and turmoil. The plane and its parts are now constructed mainly on this ideal plan. They are given stream-line shapes—roundingly blunt in front and tapering to an edge in the rear. In this case perfection has been attained or very nearly attained, for the stream-line shape and it alone enables an object to get through the air with the least possible resistance. The wing also has a highly efficient form for lift and speed.

### Biggest Factor Unimproved

But there is one factor in aviation, and today it is the biggest factor, that has not been improved one particle from the beginning, and is not going to be. That factor is the weather.

Joshua may have commanded the sun to stand still, but the wind bloweth where it listeth, and so it is with the rest of the weather elements. Elijah didn't make the rain that caused Ahab to hurry and eat and get down from Mount Carmel, he just predicted it.

It is true that we do a lot in the way of controlling weather on a small scale. We use heaters of one kind or another to temper the air in our offices, work shops and living rooms in the winter; and when it is disagreeably hot on the street we find comfort in the conditioned air of a theater. We fix the factory weather just right for a thousand and one industries, from cotton spinning to candy making.

We also do something at times with the weather for a very limited region outdoors. For instance, when frost threatens to kill fruit in blossom, or spoil it before picking, we light the orchard heaters and save the crop.

But none of these things affects the weather that concerns the aviator. In respect to his weather, the real outdoors weather, the wind still bloweth where it listeth, as it did in biblical days, does now, and will continue to do as long as there is air to move. We cannot control the weather at large, try as we may, but we can do the next best thing, we can learn a lot about it. Those, for example, who have to do with aviation, and I am talking about that art in particular, can learn how every element of the weather, and every stage of that element, affects the take off, the flight and the landing.

### Half Hour Ahead

They can also learn how to judge almost certainly of the weather of the next half hour—long enough for many of the aviator's most urgent needs—how to know what it very likely will be during the coming two or three hours, what it probably will be even a day ahead, and how to do better, as a rule, than guess its major features a week off. But it is the weather of the now and the almost now that chiefly concerns the average pilot. If he always knew what the weather would be during the next half hour he seldom would need to bother about the weather of tomorrow.

What, then, is it about the weather that concerns the aviator? Everything, in fact, but some things far more than others. It isn't nice to have to take off, or to land either, in a strong gusty wind, partly because in such winds the velocity of the machine with reference to the air, and hence the lift, varies greatly from moment to moment. The resulting bumps are bad enough in the free air but when they lead to hitting the ground the term bump hardly expresses the result.

Fog is another weather element that gives the aviator much concern, because it is impossible in a dense fog to see what is ahead of one and to pick a safe landing place. For this reason the aviator must be fully advised at all times of the occurrence of fog anywhere along his course.

Another weather element the aviator's needs have brought into especial prominence is visibility, or distance to which one can recognize objects of appropriate size by the unaided eye. If visibility is poor, no matter what the cause, whether fog, low cloud, smoke, dust or what not, the aviator probably will not know definitely

where he is, nor be able to see either the objects ahead of him or the ground beneath. Such a condition obviously renders a forced landing, or in fact any landing, distinctly hazardous.

Then he must beware of the thunderstorm. True, we sometimes read of bold aviators who, like Tam O'Shanter, never mind the storm a whistle; but on the night of his famous ride Tam was gloriously drunk, and similarly only the aviator who has lost his wits will ignore the dangers of a violent thunderstorm, for they are several and very real. At times and places the uprush of the air in this storm is so violent as to toss any machine wildly and at random despite every effort to keep it under control. At other places the rain is so heavy and the downflow so great as to drive a plane to dangerously low levels and into winds of extreme irregularity.

### Avoids Thunderstorms

Hailstones the size of hen eggs, and much larger stones sometimes occur, and are pretty certain to at least play rough-house with a propeller. There is the lightning to which few planes, if any, are yet immune. In short, the cautious aviator avoids the thunderstorm, much as a canoeist keeps out of strong rapids and away from cataracts.

There is yet another weather condition, a treacherous one, that the aviator must be wary of. That danger is the free-air ice storm, or conditions at a flying level similar to

those near the surface when trees and other exposed objects are coated with clearish ice or glaze. Ice of this kind not only loads the machine, as would any thing else, but what is much worse, accumulates in such manner as to greatly increase the drag of the machine through the air and often to so decrease its lift as to force a hurried landing.

### Where Not to Be

The place and circumstances most likely to lead to the accumulation of such a load of ice are: in a rain, whether also within a cloud or not doesn't matter, with the temperature a degree or two below the freezing point. This condition implies a warmer stratum above in which the liquid rain-drops are formed, and a colder layer beneath in which the drops are likely to freeze to sleet, of the kind that rattles when it hits a window-pane. The obvious way to avoid this danger, or to get out of it if realized in time, would be to fly either low enough to be in the fully frozen sleet, where the pellets would bounce off harmlessly, or enough higher to be in the relatively warm stratum where ice can not form.

Another place where a considerable load may be picked up is the level of wet or partially melted snow. In this case the higher temperature at which snow could not accumulate on the plane is at lower levels. Neither would the snow accumulate on the plane if the latter were taken to a considerably greater height where the snow is so cold as to be dry. (*Turn to page 111*)



Finding out about the weather at a flying field

# The Drought and Its Food Shortage

*Meteorology—Agriculture*

**N**O DANGER of actual food shortage is foreseen in the extreme drought affecting the crops in wide areas of the United States, latest information obtained at the U. S. Department of Agriculture indicates.

Luckily the major portion of the wheat crop was harvested before the effects of the continued heat had begun to tell and this means, at least, an abundance of flour for bread.

The possibility of a potato shortage still looms but is not yet serious. Meat, on the other hand, promises to be cheap. In fact, the fear is that it may be disastrously so for the farmer as pasture lands are suffering and the prospects for a normal crop lessen with each additional dry day.

A few more days of drought will mean that thousands of farmers will be forced to kill their stock this winter because they will not have enough feed to last them through until the next crop. Such a forced marketing of stock would have the effect of lowering meat prices and involve serious losses to stock raisers throughout the country. Supplies of wheat already harvested and the additional spring crop that will be garnered from the northern states, if the drought there is not too prolonged, should partially compensate for the corn crop shortage, however.

With the stock raising industry the worst hit by the drought, a milk shortage might be expected but thus far the carry-over supply of dairy products has sufficed though prices have begun to climb. Luckily the dairy communities of Minnesota, Wisconsin, and northern Iowa have not been among the worst hit, although this season of the year is normally one of reduced milk production.

## Where It Is Hottest

Regions bordering around the Ohio-Mississippi river system from Pittsburgh to the Gulf and Montana and adjacent portions of North Dakota are those worst hit by the heat

wave and three-quarters of the average crop yield is the best that can be hoped for from these sections. There is still the possibility of crops above the average from New York, the New England States, and North and South Carolina, while portions of Wisconsin, Iowa, South Dakota, and Nebraska may still be above par. But surrounding the area of extreme drought on the borders of the Ohio

**While the U. S. Parches—**

**Japan and China are having many typhoons;**

**Europe's wheat crop is threatened by drought;**

**The sea is being flooded with rains.**

and Mississippi, there is a large section which will yield slightly less than average crops, probably about four-fifths the normal yield.

## Picture Not So Black

The picture painted for the whole country is not so black, then, as might be expected though certainly it does not look bright for many communities.

This reckoning is based only on the present crop indications, however, without a calculation of the dire chances involved in continued and widespread drought. If there is no relief from the heat, the present picture is too optimistic.

America is not alone in suffering abnormal weather conditions, according to information reaching the U. S. Weather Bureau. In central, south and western Europe drought has threatened the wheat crop, which

has been especially hit in Italy. The condition in France is also bad, in Germany it is not so bad, while in England the crops have not yet been affected. Rain has come in England, so that the conditions there will probably be relieved.

In Japan and along the coast of China it has been very wet in recent weeks, with many typhoons. In South America, where the seasons are reversed and it is now the middle of winter, the weather has been unusually cold. Reports from Australia, also now in winter, indicate that the Australian wheat crop is unusually good.

With such abnormal conditions in the United States they are to be expected elsewhere, though not of the same kind, said Prof. C. L. Mitchell, of the Weather Bureau.

## Conditions Balance

"When it is excessively dry here, it will be excessively wet elsewhere, and when we have unusually hot weather other parts of the world will be unusually cold," he said. "In other words, the average over the world stays pretty much the same. Lately there have been a good many rains at sea, and a rain at sea is really a most useless thing!"

There have also been rains lately in the region east of Hudson Bay. In fact, he said, this is the center of the main disturbance of eastern North America, and other disturbed regions, or low pressure areas, have been merely satellites of this large low in Labrador. This condition permits the warm air from the Gulf of Mexico to pass unhindered in a northeasterly direction across the country. A large low over the Middle West with a high to the north of it would produce the conditions needed for rain, he said, as there is moisture in the atmosphere, and it is only necessary to precipitate it. But there are no artificial means of making it happen. Just what has caused this distribution of pressure areas Mr. Mitchell could not say.

Only the drought and hot spell of 1901 can compare with the present one, he stated. But that was confined to July, and was over by this time of the year, and this one is still continuing. Certain parts of the country were harder hit in that year than they have been so far this year, but as the present drought threatens to continue for some time it is quite likely that this will prove far worse than 1901.

*Science News-Letter, August 16, 1930*

# Butterfly Wings Take Own Pictures

*Biophysics*

## Darkness Does Not Stop Mysterious Action

**B**UTTERFLY wings give off something—either invisible light waves or a gas—that enables them to photograph themselves in the dark. This curious discovery has been made by Austin Clark of the U. S. National Museum, who is now engaged in trying to find out what the mysterious emanation is.

Mr. Clark mounted the wings of butterflies on paper, which was put on the bottom of a plate box to give a flat surface. A fresh plate, emulsion side down, was placed on it, and the sealed box, with light excluded, put away for a week or so.

When developed the plate had a clear picture of the butterfly wings, complete as to detail and relative intensity of color pattern. Black patches were black, orange areas intermediate, and white areas white, so that on the print black areas came out white and white areas black.

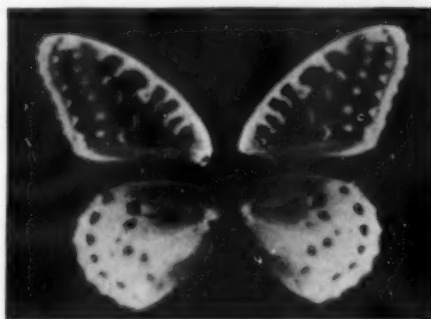
### Examine 37 Species

The wings of 37 species of butterflies were examined. Some were perfectly preserved specimens reared in the dark from fully fed caterpillars and never exposed to sunlight; others had been taken in sunlight; and still others had been dead more than 30 years. The effect was less apparent in the case of the 30-year-old specimens than in the fresh ones.

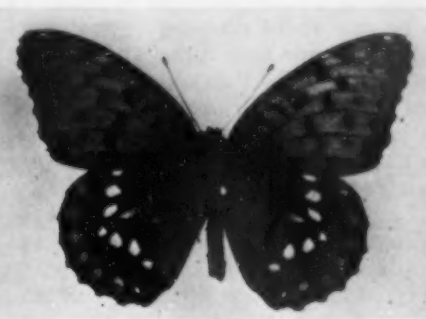
The only anomaly found was that the light spots of the common blue swallow-tail came out as if they were black instead of white—a reversibility previously noted in photographing the Parnassides, another group of the swallow-tail family. Color values were the same on films and plates, whereas photographers say that they are usually, but not always, reversed on films in case of gas emanation, tentatively explained as due to interaction between the gas and the film preservative.

### Glass Impenetrable

Exposures were made with parts of the wings covered with thin slips of glass, and others with parts covered with cellophane. The latter substance is very transparent to the short wavelengths of light, while glass is not. The glass obliterated on the negative



Left—The picture the wings took of themselves in the dark after 12 days exposure. Right—A natural picture of the same butterfly before his wings were torn off.



all portions of the wings beneath them, but the cellophane only resulted in a slight dimming of the image, with no alteration of pattern. Hence whatever causes the effect on the plate will not pass a thin cover glass, but will pass through cellophane.

This would seem to lend support to the theory that the effect is due to some kind of light waves rather than to a gas. But when Mr. Clark shielded part of a wing with a bit of thin quartz, which is even more transparent than cellophane to ultraviolet radiation, he found that the quartz blocked off the effect as completely as did glass. This leaves the nature of the cause still in doubt.

*Science News-Letter August 16, 1930*

## Cows Get Ultraviolet Rays Via Yeast

*Physiology*

**Y**EAST which has been exposed to ultraviolet rays is better than cod liver oil for increasing the rickets-preventing properties of cow's milk, Dr. Harry Steenbock, Flora Hanning and E. B. Hart of the Wisconsin Agricultural Experiment Station have found.

These investigators have been trying for some time to find a way of increasing the antirachitic property of cow's milk. The majority of infants fed on it get rickets. Earlier observations showed that summer time milk had slightly more vitamin D, the rickets-preventive, than milk produced in winter. Experiments showed, however, that it was not because the cows were getting more ultraviolet light in summer that their milk had more vitamin D in it.

Next experiments with the cows' diet were made. Cod liver oil which prevents rickets in man was not satisfactory when fed to the cows. Fed in large amounts, it lowered the secretion of butter fat. Fed in small amounts it produced little, if any, effect of an antirachitic nature.

Excellent results were, however, obtained from irradiated yeast. Two hundred grams fed daily to cows producing from 30 to 40 pounds of milk increased the vitamin D content of the milk many fold. Even 50 grams furnished enough vitamin D to make the milk highly antirachitic.

Apparently by the use of irradiated yeast one of the most outstanding deficiencies of cows' milk can be corrected in a practical way. With the present cost of yeast production, it should be possible to give milk all the vitamin D required for normal nutrition at a cost of a fraction of a cent per quart.

The use of yeast has a further advantage in that the amount of vitamin in the milk can be controlled by the feeding of a standardized yeast preparation in amounts adjusted to the milk production.

The applicability of the use of irradiated yeast for the enrichment of human milk still remains to be worked out.

*Science News-Letter, August 16, 1930*

## Pellagra and Drought

PELLAGRA has increased during the extreme summer drought in practically all the southern states, reports received by the U. S. Public Health Service, indicate.

Spread of the disease is believed to be due more directly to unfavorable economic conditions than to the severe heat and dryness, however. But indirectly the drought has been an important factor in reducing crops and bringing about the food scarcity that causes pellagra.

Exact statistics on the cases of pellagra in the various states are not available but a sizable increase in cases has been noted in North and South Carolina during the past several months and more recently health workers in Kentucky and Arkansas have reported worse conditions.

Discovery of the cause of pellagra by the late Dr. Joseph Goldberger of the U. S. Public Health Service forms a dramatic chapter in public health history. Courting the danger of the mysterious disease, Dr. Goldberger visited stricken communities of the South, particularly orphanages and asylums where the disease was most prevalent. In these places he observed that the nurses whose plates contained delicacies denied to their charges appeared immune to pellagra.

From this circumstance, he came to the conclusion, later substantiated, that pellagra is caused by deficient diet. But this knowledge was not enough to save families too poor to buy fresh meat and milk. So Dr. Goldberger continued his search, now for a cheap pellagra preventive. This he found at last in ordinary yeast, happily in time to save the lives of many victims of the Mississippi flood of 1927.

Medicine

Science News-Letter, August 16, 1930

## Racial Inter-marriage

WHEN men and women of different races inter-marry what is the inheritance they bequeath to their descendants?

An effort to find out specifically how racial mixture affects bodily size, vigor, energy and other matters of inheritance is to be made by Dr. H. L. Shapiro, assisted by W. A. Lessa, both of Harvard University. Hawaii has been chosen as an exceptionally favorable place for the investigation, in view of its large assortment of the white, yellow, and brown races, and the resulting inter-marriages.

The investigation will cover several years. Interest of the scientists will be centered first on the mixture of native Hawaiian stock with the Chinese. Dr. Shapiro expects to travel to China in a few months, in connection with this problem, to observe relatives of the Chinese-Hawaiians who represent the unmixed Chinese stock. Study of these and of pure-blooded Hawaiians will be necessary in order to measure the differences resulting from blending of the races.

The mysterious fact that Chinese who have settled in Hawaii for two generations come to differ from native residents of China will be probed by Dr. Shapiro. Climate and other possible influences will be checked, in an effort to trace the cause.

Heredity

Science News-Letter August 16, 1930

## Exploited Hens

THE subtropical bird park on Catalina Island has hundreds of species of birds and nearly all of them have been hatched by hens. These Catalina hens have an unceasing and thankless job. They are given the eggs that the wild birds lay in the open-air cages on this seven and one-half acre bird farm, and it is not for them to question why but only to sit and brood. And when the unnatural flock arrives there are sure to be misunderstandings. Misunderstandings because they cackle a different language and obey different instincts.

For example, a flock of newly-hatched pheasants will scramble to the nearest hiding places when their foster hen-mother cackles. It may only be a friendly cluck but the primitive instinct of the pheasant fledglings translates it into a warning to run for their lives. And that is just what they do, nor do they venture forth again until quietness has made friends of their instincts. For it is instinct that rules their baby brains from the moment they leave the shell until they learn from experience.

The park ornithologist helps them learn by keeping the hen in a lattice coop, so that she cannot run after the frightened flocks, which gradually become confident in being able to come and go as they please. It takes about a week for fledglings to learn chicken language; and then they are no longer frightened by clucks.

Ornithology

Science News-Letter August 16, 1930

# IN VARIOUS SIE

## Death Valley Monument

DEATH VALLEY, picturesque but forbidding trough of almost absolute desert in southeastern California, may become the newest addition to the lands administered by the U. S. National Park Service. President Hoover has signed an executive order temporarily reserving from entry certain strategic points in and about the valley, pending investigation by the Department of the Interior of its suitability for a national monument.

National monuments differ from national parks in that they are usually less developed and less visited, and hence require less elaborate administration and patrolling. A national monument may become a national park when public interest in the area becomes great enough to justify a larger outlay of administrative effort and funds. Many of the present national parks passed through a national monument phase.

If Death Valley becomes a part of the U. S. National Park System, it will be an appropriate monument in more senses than one. The late Stephen T. Mather, first director of the U. S. National Park Service, at one time had extensive business interests in the borax deposits of the region; and the present director, Horace M. Albright, was born at Bishop, Calif., on the very threshold of the valley.

National Parks

Science News-Letter, August 16, 1930

## Exciting Thinking

IF you try to multiply 19 by 18 mentally you may not feel that the task is particularly exciting, but nevertheless your heart will probably start a faster beating and your breath will come quickly and be shallow.

If someone unexpectedly slams a door behind you, your breathing and pulse rates will shoot up much higher and you will probably have a sudden contraction of the chest muscles which will cause you to give a gasp.

These facts were brought out in an experiment conducted at the College of the City of Detroit by Professor Ernest Burton Skaggs in which he attempted to find out how much emotion was involved in ordinary attention to mental tasks.

Psychology

Science News-Letter, August 16, 1930

# SCIENCE FIELDS

## Lenin's Super-Brain

SCIENTISTS, eager to know whether genius leaves a visible stamp on the brain of its owner, have been painstakingly studying the brain of V. I. Lenin, Russian leader of Revolutionary days, and have found some evidence of the type they seek.

In a preliminary announcement of his work as director of the study of Lenin's brain, Prof. Oscar Focht reports that in the third layer of the gray matter he found "pyramidal cells of such large size as I never observed before in other cases." Pyramidal cells are usually cells which act as conveyors in association processes, he explains. The condition of these brain cells is regarded as an anatomical factor linked with the variety and richness of Lenin's mental life.

Prof. Focht, the director of the Neuro-Biological Institute in Berlin, went to Moscow four years ago to start the study on Lenin, which is expected to require years of further work. So far, 31,000 microscopic films of Lenin's brain have been made. These are slices of gray matter less than one twelve-thousandth of an inch thick. Mounted on glass, the slices are subjected to microscopic analysis.

Medicine

Science News-Letter August 16, 1930

## Whooping Cough Deaths

DELAY in quarantine of whooping cough which exacts a death toll twice as large as scarlet fever is deplored by Dr. Louis W. Sauer and Leonora Hambrecht, of Evanston, Ill., in a report to the American Medical Association, recommending early diagnosis by the cough plate method.

Under the present system of diagnosis, quarantine is not usually established until after the period of greatest contagion has passed, these authorities charge. This is because the familiar whoop does not appear until the illness is well advanced. It is not necessary for the doctor to await this symptom in a suspect case, however, as the *pertussis bacillus* which causes the whoop can be detected by cough plates or disks which are held three or four inches from the patient's mouth during a coughing spell.

Cough plates are made with a coating of boiled potato, glycerin, agar, and blood mixture, prepared under conditions most favorable for the speedy growth and detection of whooping cough bacillus. To properly expose them for diagnosis, a deep explosive cough is desirable. Should the patient prove unable to cough to order, a drink of cold water, a brisk run, or a forceful slap between the shoulder blades is usually effective in bringing on an attack.

Successful trial of the cough plate method of diagnosis has been made by the Copenhagen Health Department, while in America the Commission for the Study of Whooping Cough has reported favorably on its use.

Medicine

Science News-Letter, August 16, 1930

## Asthma From Molds

A COMMON form of mold which flourishes in American soil and finds its way into damp houses to thrive there in the dirt is now accused of being a cause of asthma. A case of asthma which persisted for nine years and which has finally been traced to sensitiveness to this type of mold is reported to the American Medical Association by Dr. Harry S. Bernton of the Georgetown University School of Medicine.

This is the second case of asthma traced to mold in this country, and is the first traced to this kind of mold. Dr. Bernton, who has been testing asthmatic patients for sensitiveness to molds since 1923, believes that molds may prove to be important as causative factors in this disease. Many cases of asthma are now classed as "non-reactors," because no specific irritant has yet been found which is the cause of their distress. The new work with molds makes it likely that some of these cases may be cleared up.

Dr. Charles Thom, specialist in molds of the U. S. Department of Agriculture, has cooperated with Dr. Bernton by supplying him with sixteen kinds of molds, which have been used in tests upon patients, in the search for their particular irritant.

The young woman whose asthma proved due to a mold had lived in a damp and musty house for six years and it was apparently in this house that her nose and throat linings became sensitized to mold-laden air.

Medicine

Science News-Letter August 16, 1930

## Musical Thunder

ARTIFICIAL thunder and lighting, the sound reproducing broadcast music, was the strange phenomenon recently observed in Schenectady by radio engineers experimenting with high power short wave broadcasting.

These engineers, who operate station WGY, have already successfully solved the problem of broadcasting with as much as 200 kilowatts on waves in the broadcast band. But when high powers were used with the short wave broadcasts some curious difficulties were noticed. With only 35 kilowatts, brilliant coronas flashed and wavered like ghosts around the antenna. While warming up the transmitter, with the carrier wave on, the corona did not occur.

But as soon as the carrier was modulated with the current from the microphone in the studio, the arc was struck between the antenna and the surrounding air. It started generally about four feet from the wires and shot upwards about four feet.

As the power supplying the arc was modulated with the music, it rapidly collapsed and built up in accord with the original sound waves. This in turn set up new air vibrations like thunder, which more or less accurately reproduced the music, like a gigantic loud speaker.

If allowed to continue, the arc would finally flash across the insulators, fuse the copper wires and break the antenna. To stop this, larger wire was used and a large hemisphere placed at each end of the antenna. This increased the area of the conducting surface and prevented the corona, so that now 35 kilowatts of power are being successfully modulated even on the short wave.

Radio

Science News-Letter, August 16, 1930

## Potash Keeps Apples

THE AMOUNT of potash in the soil of the orchard appears to have an important bearing on the storage life of the apples produced.

Dr. Franklin Kidd and Dr. C. West, of the Low Temperature Station, Cambridge, England, have found that the storage life of apples on which they worked increases as the amount of available potash in the soil increases. Trees grown in soils deficient in available potash yield apples which are particularly susceptible to low-temperature breakdown in cold storage.

Agriculture

Science News-Letter August 16, 1930

# Poland Sets Up Gas War Defense

Chemistry

## America Finds Protection From Gases of Peace

**P**OLAND is undertaking to protect its civilian population against the often-painted horrors of wholesale gassing expected if a "next war" ever comes, the International Red Cross has learned.

A corps of men trained in clearing up gas-drenched areas is being formed, gas masks for civilians are to be provided and the people to be instructed in their use, and civilians are to be trained to supplement the work of the regular corps of anti-gas experts. Peace-time uses for war gases are being sought, especially in agriculture.

**W**ARNING of the presence in the air of carbon monoxide and other deadly gases such as hydrogen sulfide, may now be given by a chemical in a handy little container similar in appearance to the first-aid ampuls of aromatic ammonia. This carbon monoxide detector has been tested and found satisfactory by the Pittsburgh Experiment Station of the U. S. Bureau of Mines.

The little ampul may be carried by the workman going into garages, sewers, mines, or other places where the air might be contaminated. When the outer covering is crushed, a white filter paper or wad of white cotton soaked in palladium chloride is exposed to the air. Palladium chloride is a light straw color and does not discolor the white cotton, but as soon as it meets carbon monoxide or several other poisonous gases, the palladium is freed and the cotton turns gray or black, the density of the black depending upon the amount of the poisonous gas present.

Unfortunately for scientific purposes, palladium chloride does not distinguish between carbon monoxide and several other gases, but for practical purposes this does not matter in the least, since none of the gases is recommended for breathing purposes.

**T**HE MINGLED smell of garlic, onions, decayed cabbage, sewer gas and ancient eggs will soon wake the careless sleeper who blows out the gas and goes to bed.

For engineers of the Bureau of Mines have developed a warning

chemical of terrible smell that they urge should be added to odorless illuminating and fuel gases by gas companies before the fuel is placed in city mains.

Ethyl mercaptan, an organic sulfur compound, is the smelly stuff that would be added to provide an unmistakable signal of escaped gas. It has such an intense, disagreeable odor that only one hundredth of a pound of it in a million cubic feet of air will warn. Gas companies could put about eight pounds of it in each million feet of gas and any slow leaks in houses would soon be detected, and about forty pounds per million cubic feet of gas would allow their inspectors to detect leaks in mains and service lines underground.

Most manufactured gas has an odor that can be detected when the gas escapes into a room, but natural gas is practically odorless. This is because natural gas is practically pure methane,  $\text{CH}_4$ . Artificial gas, how-

ever, in the process of its manufacture from coal accumulates oxygen and complicated compounds of methane, ethylene, and acetylene which cause the odor.

Natural gas was until recent years allowed to escape from wells but is now piped to a distance of a thousand miles and promises eventually to supersede coal as a fuel in industry. This has brought forward the problem of safe and economic distribution over vast gas systems and made necessary the evolution of a super-smell like ethyl mercaptan.

Possibilities of using ethyl mercaptan for a danger signal were first tested about 10 years ago in mines. A little of it was put in the air supply lines and within 5 or 10 minutes the miners were beating a hasty exit.

Ethyl mercaptan is a liquid closely related to the alcohols, and is sometimes called thio-alcohol.

*Science News-Letter August 16, 1930*

## Prehistoric Indian "Melting Pot"

Archaeology

**A** MELTING pot of prehistoric Indian cultures, in which were blended the ways of the settled, farming Pueblos and those of the wandering plains tribes, has been discovered along the Canadian River in Northern Texas.

Ruins of the villages of this ancient mixed culture are yet so little investigated that the culture has been given no name by archaeologists, Dr. J. Alden Mason, of the Museum of the University of Pennsylvania, states. An expedition from the museum spent some time excavating one of these sites last summer. Other sites have been visited by Texas scientists and a survey made by Prof. Warren K. Moorehead, of Phillips Academy, Andover.

The Canadian River is one of the few streams which rise in the Pueblo region in New Mexico and flow eastward to meet the Mississippi, Dr. Mason points out. It therefore served as a river highway for cross-country travel and along this route there was a meeting not only of tribes but of ideas.

The houses along this Indian highway are rather small and of irregular shape. The foundations are sunk, pit-like, and above these basement walls the outlines of the houses can still be seen set in stones. Excavations show that the roofs were of poles, straw, thatch, and mud, and supported by four large posts.

Traces of destructive fires are discovered in some houses, where the charred and damaged debris was trampled down, covered over, and a new floor laid above it. Some of the charred charcoal beams have been saved, Dr. Mason states, in the hope that the tree-rings in these beams may show the dates when the houses were built.

The houses are in the early Pueblo or pre-Pueblo style. But the pottery is quite unlike Pueblo ware. These villages had very little household pottery and what they had was rudely made, similar to that of the plains. Weapons and tools flaked and chipped from stone are common in the ruins, Dr. Mason found.

*Science News-Letter, August 16, 1930*

# The Eiffel Tower

## A Classic of Engineering

*THE EIFFEL TOWER. By G. Eiffel. From the New Review, reprinted in the Report of the Smithsonian Institution for 1889. Washington, 1890.*

The notion of a tower 1,000 feet in height is not new. It has haunted the imagination of Englishmen and Americans. As early as 1833, the celebrated English engineer Trevitick proposed to construct a cast-iron tower 1,000 feet high, of which the diameter should be 100 feet at the base and 4 feet at the summit. But his project was never put in execution, and was but imperfectly worked out even on paper.

At the time of the Exhibition in Philadelphia, in 1876, the great American engineers, Messrs. Clarke and Reeves, brought forward a new project. Their tower was to consist of an iron cylinder 9 meters in diameter as a nucleus, and supported by a series of metal buttresses disposed round it and starting from a base with a diameter of 45 meters. This was a distinct improvement on the English project, although it still left room for criticism; and yet the Americans, in spite of their enterprising spirit and the national enthusiasm excited by this conception, shrank from its execution.

### Tower in Paris Proposed

In 1881, M. Sébillot proposed to light Paris by an electric lamp placed at a height of 1,000 feet. This idea, which has, in my opinion, no practical value, had no better fate than its predecessors. I need only mention the designs, some in masonry, some in metal work and masonry combined, others, lastly, in wood, like the proposed tower for the Brussels Exhibition, which were produced at the same time as my own. But all these remained in the domain of fancy, proposals easy to frame but hard to execute. I come to the project which has been realized.

In 1885, after the studies which my engineers and I had occasion to



make with regard to the lofty metal piers which support railway viaducts like that of Garabit, we were led to believe that it was possible to construct these without any great difficulty of a much greater height than any hitherto made, which did not exceed 230 feet. We planned on these lines a great pier for a viaduct which should have a height of 395 feet and a base of 131 feet.

The result of these studies led me, with a view to the exhibition of 1889, to propose the erection of the tow-

er, now completed, of which the first plan had been drawn out by two of my chief engineers, Messrs. Nougier and Koechlin, and by M. Sauvestre, an architect.

The fundamental idea of these pylons or great archways is based on a method of construction peculiar to me, of which the principal consists in giving to the edges of the pyramid a curve of such a nature that this pyramid shall be capable of resisting the force of the wind, without necessitating the junction of the edges by diagonals, as is usually done.

On this principal the tower was designed in the form of a pyramid, with four curved supports, isolated from each other and joined only by the platforms of the different stories. Higher up only, and where the four supports are sufficiently close to each other, the ordinary diagonals are used.

### Eiffel's Plans Accepted

In June, 1886, a commission nominated by M. Lockroy, then minister of commerce and industry, finally accepted the plans I had submitted to it, and on January 8, 1887, the agreement with the State and the City of Paris was signed, fixing the conditions under which the tower was to be constructed.

It is needless to state that considerable energy and perseverance were required to attain this result, for there was much resistance to overcome, and my project had many opponents.

Hence the material of which the tower was to be built was determined not only by the fact that it rendered construction possible, but also because it would supply a brilliant example of a modern industry in which France has been more especially distinguished since its introduction.

The base of the tower consists of four great piers, which bear the

names of the four cardinal points. The first matter which offered itself for consideration was the question of the solidity of the foundation of these four piers. A series of borings showed that the subsoil in the Champ de Mars was composed of a deep stratum of clay capable of supporting a weight of between 45 pounds and 55 pounds to the square inch, surmounted by a layer of sand and gravel of varying depth, admirably calculated to receive the foundations. The actual position of the tower was determined by considerations relative to the depth of this stratum, since it was impossible to rest the piers directly on the clay. The foundation of each pier is now separated from the clay by a sufficient thickness of gravel.

### Method of Construction

Each of the main supports of the tower rests on blocks of masonry, and the masonry rests on beds of concrete which cover an area of 60 square meters. In the center of each pile of stone-work, are two great iron bars 25 feet 6 inches in length and 4 inches in diameter, which, by means of iron clamps, unite almost all parts of the masonry. This anchorage, which is not necessary to the stability of the tower—sufficiently assured by its own weight—gives nevertheless additional security, and has moreover been useful in the construction of the iron-work.

It will be seen from the foregoing description that the foundations are established under conditions of great security, and that in the choice of materials and in the dimensions ample margin has been allowed, so as to leave no room for doubt with regard to their solidity.

Nevertheless, to render perfectly certain that the feet of the tower should remain absolutely level in any event, we have made room, at the angles of the piers where they rest on the masonry, for hydraulic presses of 800 tons. By means of these presses each pier can be displaced and raised as much as is necessary by inserting steel wedges beneath it.

The raising into place of the iron-work which forms the upper part of the tower was accomplished by derricks and windlasses. As soon as the piers reached a height of 100 feet their inclination rendered scaffolding necessary to carry on the construction to a height of 169 feet, at which point are established the horizontal beams uniting the four piers and forming the skeleton of

the first story. The solid construction of the first platform was a great step toward the success of the work.

The raising of the pillars between the first and second platforms was rapidly accomplished by the same method as that employed between the ground and the first story, *i. e.*, the pieces of iron were raised by four cranes attached to the beams of the lift placed in each pier.

The work went forward so rapidly that in July, 1888, the four pillars were united by the beams of the second story, at a height of 387 feet, and by the 14th of the month the second platform was fixed, on which fireworks were displayed at the Fête Nationale.

The erection of that part of the tower comprised between the second platform and the summit was carried out by means of the same cranes as had served for the lower part; but these no longer worked on an inclined plane, but were raised along an upright, formed by the central guide of the higher lifts.

The total weight of the iron-work in the tower is rather more than 7,000 tons, without counting that in the caissons, which form a portion of the foundations, or that in the machinery of the lifts.

The different parts of the tower are reached by staircases and lifts. There are easy stairs in the east and west piers, which give access to the first story, and it is calculated that by using one for ascent and one for descent they will allow more than two thousand persons to go up and come down in the hour. From the first platform to the second there are four winding staircases, one in each pier, and from the second platform to the summit there is a single winding staircase, which, however (unlike the others) is not intended for the use of visitors, but for officials only.

### The Three Platforms

On the first platform is a covered gallery, with arcades, whence visitors can enjoy a view of Paris and its environs, as well as of the Exhibition, with four refreshment rooms in the center,—Anglo-American, Flemish, Russian, and French. On the second story is a second covered gallery; and in the center is the station where passengers change from the lifts which move on an inclined plane of the lower half of the tower, to the vertical lifts of the upper portion.

On the third story is a great saloon more than 50 feet square, shut in by glass on all sides, and whence, sheltered from wind and weather, the spectator can contemplate the magnificent panorama, 45 leagues in extent, which is displayed beneath him. Above this room are laboratories and observatories for scientific purposes, and in the center the winding stair leading to the light-house whence the electric light shines over the whole of Paris.

The lifts are on three different systems, and all are provided with breaks, and otherwise insured against the possibility of serious accident...

I will not weary my readers with the enumeration of all the experiments to be made on the tower, of which a programme has been already drawn up by our scientific men, and which include the study of the fall of bodies through the air, the resistance of the air to varying velocities, certain laws of elasticity, the study of the compression of gases of vapors under the pressure of an immense manometer of 400 atmospheres, a new realization on a great scale of Foucault's pendulum demonstrating the rotation of the earth, the deviation toward the East of a falling body, etc., etc.; lastly, a series of physiological experiments of the deepest interest. . . .

### Scientific Uses of the Tower

Thus it will be an observatory and laboratory such as was never until now at the disposal of science; and from the first all our scientific men have encouraged me with their warmest sympathy. On my side, and in order to express in a striking manner that the monument which I have raised is dedicated to science, I decided to inscribe in letters of gold on the great frieze of the first platform, and in the place of honor, the names of the greatest men of science who have honored France, from 1789, down to our own day.

Besides all these uses, which I might have explained in greater detail, but which, even in this rapid summary, will serve to show that we have not erected an object of barren wonder, the tower possesses in my eyes a usefulness of a totally different order, which is the true source of the ardor which has inspired me in my work. . . .

My object was to show to the whole world that France is a great country, and that she is still capable of success where others have failed.

*Science News-Letter, August 16, 1930*

# Distorted Spectrum Reveals Star Speed

*Astronomy*

## Some Turn 150 Times Faster Than The Earth

**B**ECAUSE a spinning star is both moving toward you and away from you at the same time, astronomers can now measure their speed of rotation, and have found many that turn at 40 miles a second, 150 times the speed of the earth at the equator.

This seemingly paradoxical effect occurs merely because one side of a turning sphere approaches while the opposite side recedes. Stand in front of a phonograph and watch the turntable as it revolves. If you drop a bit of paper or some small object on the right side, it will be carried towards you, but if you drop something else on the left side, it will be carried away from you at the same time.

### Light Waves Squeezed

Then, of course, the first thing will go from you and the second towards you. Only if you were directly above the turntable, or if the phonograph were tilted so that you were in line with the axis of rotation, would all parts of the table remain constantly at the same distance.

This is an example of the principle used by C. T. Elvey, astronomer at the Yerkes Observatory of the University of Chicago, to measure how fast a number of stars are turning. The method was developed by a Russian and a German astronomer, also at the Yerkes Observatory, Dr. G. Shajn and Dr. Otto Struve.

By a well known and often used effect, the spectroscope can be used to reveal the motion of a heavenly body. When a star rapidly approaches the earth, the light waves are squeezed together and made shorter. With light from a rapidly receding star the waves are spread out, and made longer. As it is the length of the wave that determines its color, or position in the spectrum, the light from an approaching star is bluer and from a receding one redder than if the star were standing still.

The spectroscope reveals a host of dark lines in the spectrum of a star, and by measuring the position

of these as compared with the same lines in the spectrum of a light from an earthly source, the speed of the star can be determined. If the lines in the star spectrum are shifted to the red, it shows that the star is receding, but if they are shifted to the blue end, it shows an approach of the star. The amount of the shift indicates the speed.

### Also Measures Sun's Rotation

This phenomenon, called the Döpler-Fizeau effect, can also be used to measure rotation of such a body as the sun. By making spectrum photographs with the light from one side and then from the other side of the sun, the speeds of approach and recession of these sides can be measured and from them can be determined the rate of rotation.

Though the stars are the same shape as the sun, they are all so far away that the closest present no appreciable disc, but seem like points of light, even with the largest telescopes. Consequently, it is impossible to isolate the light from one side by ordinary methods. Dr. Frank Schlesinger, now director of the Yale Observatory, but then at the Allegheny Observatory in Pittsburgh, found a way of doing it in 1909.

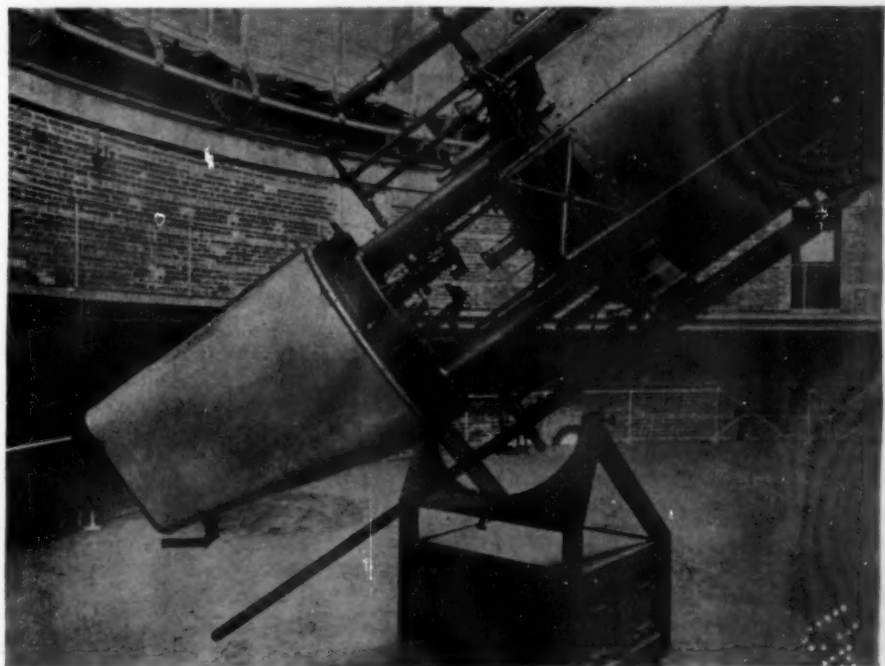
There is a certain class of stars called Algol variables, typified by the star Algol in the constellation of

Perseus. These consist of two separate bodies, one bright and the other dark. In some, like Algol, the dark body periodically comes between us and the bright one, causing an eclipse and a diminution of light. Just before or just after the maximum eclipse, the light comes mainly from one side or the other of the bright body. Therefore, spectrum photographs made at these times show shifts of the lines, due to the rotation of the star.

Only a small proportion of the stars in the sky are Algol variables, and so this method is limited. But the method worked out by Drs. Shajn and Struve is applicable to any type of star, provided it is rotating with sufficient speed, and shows suitable spectral lines.

The light from a spinning star is made from a source that is both approaching and receding, and so the lines in the spectrum are really shifted both ways at once. The result is that a line which is dark and narrow in a stationary star would be fainter and wider in a turning one. Part of it would be displaced to one end of the spectrum and part to the other.

Mr. Elvey has measured what is called the "contour" of a line with the instrument known as the recording microphotometer. In this instrument the spectrum plate is moved in front of a narrow slit



The Bruce Spectrograph of the Yerkes Observatory attached to the 40-inch telescope, as used by Mr. Elvey. It analyzes the light of spinning stars to tell how fast they turn.

through which a light shines. An electrical arrangement measures the amount of light which gets through and makes an automatic record by a moving spot of light on a strip of photographic paper. A single sharp narrow line makes a deep notch in the line on the paper after development. But if the spectrum line is broad and faint, it makes a flat "bay," broad and shallow. The "contour" of the line refers to its shape when recorded by the microphotometer. As the spectrum line of wave length 4481 due to ionized magnesium is ordinarily sharp and narrow, it is well adapted to such studies and was the one used by Mr. Elvey.

Of 59 stars that he has studied, the average surface speed is 60 kilometers (37 miles) a second. The sun, at its equator, turns only about 2 kilometers a second. Therefore if these stars are the same diameter as the sun, which is of about average size, they turn about thirty times as

fast, or about once in 24 hours. The sun is about 865,000 miles in diameter and turns once in about 28 days. At the equator of the earth the speed is only about 400 meters, or about a quarter of a mile, a second, because of its much smaller size.

These speeds for the stars are conservative, because Mr. Elvey has made no consideration of the effect of darkening at the limb of the star. Most of the star's light comes from the center as it faces us, the region which is not approaching or receding. This makes the broadening of the spectrum line less than if the light came with equal intensity from all parts of the star.

One star studied by Drs. Shajn and Struve is turning even faster. It is known as W Ursae Majoris, and is in the Great Bear. Though about three quarters as large as the sun, or 650,000 miles in diameter, it turns once in a third of a day.

*Science News-Letter, August 16, 1930*

## Fish Die in Water for Want of Air

*Physiology*

FISH dying in an abundance of water, because they were not getting enough of the air that is traditionally supposed to be fatal to them, have been the subjects of study in two German laboratories during the past few months.

The researches were prompted by the fact that great numbers of fish died of suffocation under the thick ice produced by last winter, which was unusually severe in Europe; and scientists wanted to know, for both practical and theoretical purposes, just how much oxygen has to be dissolved in water in order to sustain fish life.

Goldfish and carp became distressed and finally died when the oxygen in the water fell to a concentration of from four one-hundredths to one-tenth of one per cent. Whiting, perch, and several other species of fish showed signs of distress at one tenth of a per cent., and died when the concentration fell below eight one-hundredths of one per cent.

The requirements of trout, earlier experiments showed, are higher. This active fish can get along on water containing from five-tenths to eight-tenths of one per cent of oxygen, finds one third that much insufficient, and dies if the oxygen falls below that. Carp can live easily where trout find it suffocating, can endure what

kills a trout, but finally die at the low figure of five one-hundredths of one per cent.

Tenacity of life under ordinary hardships does not seem to have anything to do with ability to withstand low oxygen rations. Observers noted last winter that eels, one of the hardest-to-kill of all fish, were the first to suffocate when thick ice cut off the air supply from their water.

*Science News-Letter August 16, 1930*

## Parks for England

THE preservation of natural beauty in England by the transfer of large parks, at present owned privately, to public ownership is advocated by S. K. Ratcliffe in a report to the Royal Society of Arts.

The expansion of cities, and the changing system of land ownership which is reducing the amount of land held by single individuals, is increasing the need for a national park policy in that country if any large stretches of country are to be preserved for the future in their present state. The American national parks were cited as models, but Mr. Ratcliffe proposed that the national parks in England should be barred to motor cars.

*National Parks*

*Science News-Letter, August 16, 1930*

## Million Volt Globe

THE shiny metal globe which the front cover pictures was spun on a lathe from two flat sheets of copper one-eighth inch thick. It will be used with another by the Westinghouse Electric and Manufacturing Company to measure man-made lightning of 2,000,000 volts and greater.

When high potentials are measured by sphere spark gaps the distance between the spheres must not be greater than their diameters if the measurements are to be accurate, it has been found. One hundred centimeter, 39.3-inch diameter, spheres had been made to measure one million volts. This one is 150 centimeters, 59.16 inches, in diameter.

The old spheres were turned from cast brass and were heavy and expensive. The new one is simply made and weighs little more than 400 pounds. The flat metal was spun against a huge hemispherical wooden form. Two hemispheres of copper were made and soldered together. So accurate are they that their diameters differ by less than one-tenth inch.

*Electrical Engineering*

*Science News-Letter August 16, 1930*

## Up from New Mexico

THE small town of Roswell, New Mexico, will soon be the scene of preparations for one of the most spectacular and also the most important scientific experiments ever performed. Prof. R. H. Goddard, of Clark University, famous authority on rockets as a means of exploring the upper atmosphere, has gone to Roswell and has announced that he will make his future experiments from that region. The favorable climate, the nature of the country and the clear air were the chief factors that induced him to select the site.

A grant from the Guggenheims recently made to Prof. Goddard, will permit him to continue his experiments on a much larger scale than in the past. Camp Devens, Mass., near Worcester, his home, had been selected before, but the New Mexico location will now be used instead. Prof. Goddard emphasized that the preliminaries would take considerable time, and that it is impossible at present to state when he will start shooting actual rockets into the air.

*Astronautics*

*Science News-Letter, August 16, 1930*

## NATURE RAMBLINGS

By Frank Thone



Kansas B'Gosh

WHEN the long trains of covered wagons toiled across the hot western plains, back in the days of our grandsires, the most cheerful sight on the monotonous horizons, next to the lines of cottonwoods and willows that bespoke water, were the great masses of yellow sunflowers. Across the wide bottoms of the Platte and all those other rivers that were "a mile wide and an inch deep" these golden armies marched, plucky and optimistic as the settlers themselves.

When the comers into the new land literally dug themselves in, holding out against drought, winter, Indians and grasshoppers in their meager sod shanties, they often had to fall back on the stalks of these sunflowers for something to burn in cold weather, for often there was little firewood in the land.

In the days of our prosperity we often pluck up some familiar thing we had with us when times were harder, and wave that as a proud banner. So it comes to pass that wherever there is a national convention of any kind, be it Rotarians, or Elks, or Shriners, or Professors of Classical Languages, the delegation from Kansas invariably blossoms a flaring sunflower from each button-hole.

But the common sunflower is far from being confined to the state whose badge it has become. It shines around the whole world like a golden crown. In Russia, where there are areas much like Kansas, it has been developed into a highly respectable crop plant that figures in national economics as a source of oil and cattle feed. And you can no more stop the Russian peasant girl from nibbling sunflower seeds as we eat peanuts than you could keep her from looking in a mirror. For doesn't she know that sunflower seeds are good for the complexion?

Science News-Letter, August 16, 1930

## Vitamins and Variety

THE most important factor affecting the vitamin C content of apples is the variety of the apple. The character of the soil, age of the tree and season of picking have practically no effect. These are preliminary results of an investigation on the vitamin contents of different kinds of fruits and different varieties of one fruit which is being conducted by Mary F. Bracewell, Edward Hoyle and Dr. S. S. Zilva at the Lister Institute, London.

The English cooking apple, Bramley's Seedling, was much more active in antiscorbutic properties than any other cooking or dessert apple which was tested. This indicates that this variety contained the most vitamin C.

There was very little loss of vitamin C when the apples were stored at one degree centigrade in the air for three months. When stored for the same period at 10 degrees centigrade in a gas mixture of carbon dioxide, nitrogen and oxygen, there was slightly more deterioration. One of the most interesting results was that after Bramley's Seedlings had been heated in their skins they showed practically the same antiscorbutic power as before.

Dietetics

Science News-Letter August 16, 1930

## Deafness Pre-Natal

DEAFNESS is a part of disordered growth, beginning far back in pre-natal life and becoming more severe with increase in age.

This is the most striking conclusion reached from a series of investigations into causes and conditions of deafness, conducted by the Department of Psychology of Temple University at Philadelphia under the direction of Dr. Thaddeus L. Bolton.

Results of the investigations, just made public, show that in some children the auditory organs were missing altogether. In other cases, the ears were so deformed that they could not function. The investigation would indicate that all forms of impaired hearing, with the exception of deafness caused by accident, are due to abnormal development of the hearing organs, beginning with pre-natal life. The psychologists believe that "the comparative timing of the cycles of growth of the various structures may play a part" in the disordering of the ear structures.

Physiology

Science News-Letter, August 16, 1930

## Weather—Continued

Finally, the temperature within a cloud may be considerably below freezing and the droplets still liquid, in which case the front portions of a passing plane become more or less coated with a sort of tufted frost, but seldom if ever to a dangerous extent as it is shaken off by even moderate jolts and jars.

What then must the aviator know about the air and its ways? That depends on the kind of an aviator he wants to be. The fair weather aviator, one who flies only when the weather is ideal, can get along pretty well if brought up on one or more of the various recent books of meteorological misinformation, for there is nothing to bother him. The devil-may-care aviator has no business in the air anyway.

The safe and sane aviator, however, can and does use to great advantage all the correct information and clear understanding he can get of every mood and manner, from the mild and peaceful to the madly tumultuous of the medium in which he flies. The pilot that knows the air and knows that he knows it is the safest of all. Fly with him.

Science News-Letter, August 16, 1930



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## FIRST GLANCES AT NEW BOOKS

**UNCLE SAM'S CAMELS**—L. B. Lesley—*Harvard Univ. Press.*, 298 p., \$4. During the 1850's Jefferson Davis, then Secretary of War, successfully promoted a project for importing a number of camels into the newly acquired Southwest for the use of Government forces in the desert regions. The experiment ended in failure, due at least in part to the coming of the Civil War, but there have been many legends and much scattered literature about Uncle Sam's Camels. Prof. Lesley here offers all the authentic information still extant about this undertaking, including transcripts of official documents and the journal of the men who had the drove in charge from Galveston to their final dispersal in California. As may be suspected by anyone who has even a little knowledge of the ways of camels, there is humor as well as history in this book.

*History*

*Science News-Letter*, August 16, 1930

**THE LIFE OF HERMANN M. BIGGS**—C.-E. A. Winslow—*Lea and Febiger*, 432 p., \$5. The story of Dr. Biggs' life is the story of the sound beginnings of the public health movement in this country. His achievements in this field are of a monumental character, wrote Dr. William H. Welch in the foreword to Dr. Winslow's book. Biggs' name is particularly associated with the New York City and State health departments and with the control of tuberculosis, to which he devoted much of his time, thought, energy and study. This biography should be interesting reading to every lay reader and of course deserves a place in the library of every public health worker.

*Biography—Public Health*

*Science News-Letter*, August 16, 1930

**A STUDY OF SOME CHARACTERISTICS OF VEGETABLE OILS**—James B. McNair—*Field Museum*, 21 p. A brief summary and grouping of the classes of vegetable oils according to their various properties, followed by tables giving saponification values, specific gravities and iodine numbers of a large number of oils, fats and waxes, and a table of oil-producing plants arranged in botanical order by families.

*Chemistry*

*Science News-Letter*, August 16, 1930

**ADOLESCENCE**—Frankwood E. Williams—*Farrar and Rinehart*, 279 p., \$2.50. A series of studies in mental hygiene by a leading psychiatrist. The book should prove helpful to all who are dealing with that trying period known as adolescence, which often continues far longer than is suspected. In fact, Dr. Williams suggests that there are no adults. A list of less obvious signs of emotional immaturity is given in the first chapter. It ends with the "one (if the task be self-imposed) whose desk *must* be clean by night."

*Mental Hygiene*

*Science News-Letter*, August 16, 1930

**THE SECOND INDUSTRIAL REVOLUTION AND ITS SIGNIFICANCE**—Percy S. Brown and others—*American Academy of Political and Social Science*, 224 p. The authors of the papers in this volume have tried not only to describe the subject but also to anticipate what the results of the second industrial revolution may be and to point out how the less fortunate of these results may be avoided or mitigated. Reviews of pertinent books conclude the volume.

*Economics*

*Science News-Letter*, August 16, 1930

**DICTIONARY OF BIOLOGICAL EQUIVALENTS**—Ernst Artschwager—*Williams and Wilkins*, 225 p., 6 plates, \$4.50. The author, who has already produced a successful *Dictionary of Botanical Equivalents*, here gives us a reference work of wider scope. Between *Aal* and *Zypressen-Wolfsmilch* he packs in a good many thousands of English equivalents of the German words that so frequently stump us, and to which we can find no clue in the "literary" type of German-English dictionary. He misses a few terms; but that is not remarkable, considering how the vocabularies of all sciences grow in all languages; and in future editions (the book will merit many) such lacks will without doubt be supplied. Useful supplements are a list of frequently used German abbreviations, a conversion table for metric weights and measures, and a series of six keyed plates showing the principal anatomical details of flowers, fruits, birds and insects.

*General Science*

*Science News-Letter*, August 16, 1930

**PARACHUTE**—Charles J. V. Murphy—*Putnam*, 275 p., \$2.50. An epic of the life saver of the air that begins with the famous experiments at McCook Field in May, 1919, that gave birth to the modern parachute, and ends with a prediction of what parachutes of tomorrow will do.

*Aviation*

*Science News-Letter* August 16, 1930

**THE SKELETAL REMAINS OF EARLY MAN**—Ales Hrdlicka—*Govt. Printing Office*, 379 p., 93 pl., \$2.25. Since 1914, when Dr. Hrdlicka first summed up in a single publication all the known data regarding skeletal remains of ancient man, a vast fund of new information has come to light. The number of new finds in old fields has greatly increased the material available for comparative study, and the discovery of strange types, such as Rhodesian man, as well as of familiar types in remote places, such as the neanderthaloids of Peking and Capernaum, has greatly widened the paleanthropologist's horizon. For this reason the present exhaustive and excellently illustrated monograph will be most heartily welcomed in all parts of the world. In preparing his material, Dr. Hrdlicka was not content merely to collate existing sources, voluminous though they were. He travelled thousands of miles to practically all the classic shrines of early man, examining and measuring the relics with his own eyes and hands. This is an invaluable contribution, since it reduces the incalculable "human factor" at least to the terms of a single personality.

*Anthropology—Evolution*

*Science News-Letter*, August 16, 1930

**THE DIFFERENTIAL ANALYSIS OF STARCHES**—James B. McNair—*Field Museum*, 44 p. Information in tabular and summary form regarding chemical and physical reactions of a large number of starches.

*Chemistry*

*Science News-Letter*, August 16, 1930

**FAUNA OF THE KIMMSWICK LIMESTONE OF MISSOURI AND ILLINOIS**—John H. Bradley, Jr.—*Univ. of Chicago Press*, 69 p., 30 pl. The record of a paleozoic fauna, of interest to historical geologists and paleontologists.

*Paleontology*

*Science News-Letter* August 16, 1930